

IN THE CLAIMS

1. (Previously presented) A method for using surface and curve functions and positions in a CAD model to define the geometry of a shape to allow the transformation of the shape with a function, said method comprising the steps of:

Obtaining a solid model containing one or more faces, edges and/or vertices, where the underlying geometry of each face, edge or vertex may be represented, respectively by a surface, curve, or position, and each surface or curve may be represented by a function mapping from a domain space into 3-dimensional space;

Defining a transformation function mapping from 3-dimensional space to 3-dimensional space;

Creating new surface and curve functions by performing function composition with each of the existing surface and curve functions with the transformation function;

Creating new, surfaces and curves by taking each point in the domain of each of the original surface and curve functions and passing the point through the corresponding new function, and creating new positions by passing each original position through the transformation function; and

Resetting the geometry of the CAD model.

2. (Currently Amended) A method for transforming the geometry of a solid model with a transformation function, comprising the steps of:

providing a solid modeler;

obtaining a solid model having a topology and a geometry corresponding to said topology, said geometry comprising one or more surfaces or curves, each surface or curve defined by a function;

defining a transformation function; and

transforming the geometry of the solid model by composing each function of said geometry with said transformation function.

3. (Previously presented) The method as claimed in claim 2, where the topology comprises one or more faces, edges and vertices.

4. (Canceled)

5. (Currently amended) The method as claimed in claim 4-3 where each surface in the geometry corresponds to a face in the topology, each curve in the geometry corresponds to an edge in the topology and each position in the geometry corresponds to a vertex in the topology.

6. (Canceled)

7. (Previously presented) The method as claimed in claim 2, further comprising the step of displaying the solid model after the step of transforming the geometry.

8. (Previously presented) The method as claimed in claim 2, further comprising the step of storing said solid model after the step of transforming the geometry.

9. (Canceled)

10. (Canceled)

11. (Previously presented) The method as claimed in claim 2 where the transformation function defines a non-linear transformation.

12. (Previously presented) The method as claimed in claim 2 where the transformation function defines a bend transformation.

13. (Previously presented) The method as claimed in claim 2 where the transformation function defines a stretch transformation.

14. (Previously presented) The method as claimed in claim 2 where the transformation function defines a twist transformation.

15. (Currently Amended) A method for transforming a solid model using a generalized transformation function mechanism, comprising the steps of:
providing a computer aided design system adapted to display a solid model and having a transformation component adapted to transform said solid model using a transformation function;
obtaining said solid model, wherein said solid model has a geometry and a topology, said geometry comprising one or more surfaces or curves, each surface or curve defined by a function;
displaying said solid model;
obtaining a transformation function;
operating said transformation component to transform the geometry of said solid model by composing the functions of the geometry with said transformation function;

displaying the solid model after the geometry has been transformed with said transformation function; and

storing said solid model after the geometry has been transformed with said transformation function.

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16. (Previously presented) The method as claimed in claim 15, where the topology comprises one or more faces, edges and vertices.
17. (Canceled)
18. (Currently Amended) The method as claimed in claim 16~~17~~ where each surface in the geometry corresponds to a face in the topology, each curve in the geometry corresponds to an edge in the topology and each position in the geometry corresponds to a vertex in the topology.
19. (Canceled)
20. (Canceled)
21. (Canceled)
22. (Previously presented) The method as claimed in claim 15 where the transformation function defines a non-linear transformation.
23. (Previously presented) The method as claimed in claim 15 where the transformation function defines a bend transformation.
24. (Previously presented) The method as claimed in claim 15 where the transformation function defines a stretch transformation.
25. (Previously presented) The method as claimed in claim 15 where the transformation function defines a twist transformation.

26. (New) The method as claimed in claim 2, where the step of transforming the geometry of the solid model by composing said transformation function with each function of the geometry further comprises the steps of:

creating new surfaces, curves and positions by composing each surface, curve and position function of the geometry with said transformation function; and

resetting the geometry of said solid model to said new surfaces, curves and positions.

27. (New) The method as claimed in claim 15, where the step of operating said transformation component to transform the geometry of said solid model by composing the functions of the geometry with said transformation function further comprises the steps of:

operating the transformation component to create new surfaces, curves and positions by composing each surface, curve and position function of the geometry with said transformation function; and

operating the transformation component to reset the geometry of said solid model to said new surfaces, curves and positions.